#2 $\frac{1}{20}\left(\sqrt{\frac{1}{20}}+\sqrt{\frac{2}{20}}+\sqrt{\frac{3}{20}}+\cdots+\sqrt{\frac{20}{20}}\right)$

p293 h

$(y_1+y_2+y_3 \cdots + y_n)\,h$ = ram

$y=\sqrt{x}$ $\qquad \sum_{k=1}^{n} f(a+k\cdot h)\cdot h$ ram

$a=0$

$b=1$

$n=20$

$f(x)=\sqrt{x}$

B

$h=\frac{b-a}{n}$

$\frac{1}{20}=\frac{b-0}{n}$

$\int_0^1 \sqrt{x}\,dx$ $\boxed{B}$

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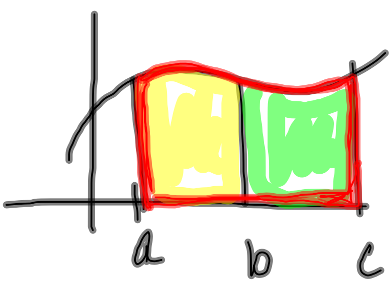
1 d) $\int_2^5 f(x)\,dx$

$\int_a^b + \int_b^c = \int_a^c$



$\int_1^2 + \int_2^5 = \int_1^5$ ✓

$\int_2^5 = \int_1^5 - \int_1^2$

$= 6 - -4 = \boxed{10}$

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$$\int_b^a = -\int_a^b$$

6. $\int_1^3 = ?$

$$\int_{-1}^1 + \overset{?}{\int_1^3} = \int_{-1}^3$$

$$\int_{-1}^1 = 0$$

$$\int_{-1}^3 = 6$$

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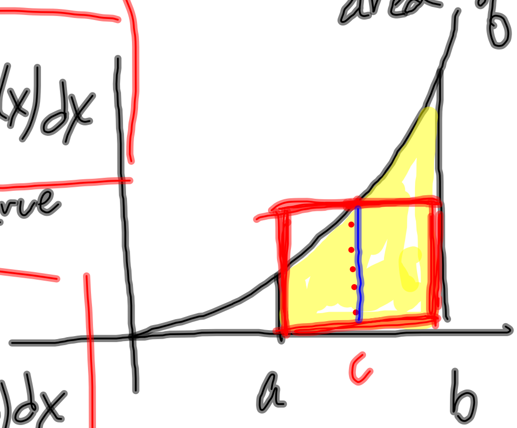
5.3 b Mean Value Theorem for Integrals

(MVT) net area under curve = area of rectangle

$$\boxed{\underbrace{(b-a)f(c)}_{\text{rect}} = \underbrace{\int_a^b f(x)dx}_{\text{curve}}}$$



$$\boxed{f(c) = \frac{1}{b-a}\int_a^b f(x)dx}$$

average value of $f(x)$ on $[a,b]$

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a) Find the average value of $y = x^2$ on $[1, 3]$
$f(c)$

b) Find the value that satisfies the MVT for def integrals
(find c)

$$\frac{1}{3-1}\int_1^3 x^2\,dx = \frac{1}{2}\left(\frac{x^3}{3}\right|_1^3$$

$$= \frac{1}{2}\left(\frac{3^3}{3} - \frac{1^3}{3}\right) = \frac{1}{2}\left(9 - \frac{1}{3}\right)$$

$f(c) = 4\frac{1}{3}$
(ave value)

$$= \frac{26}{6} = \frac{13}{3} = 4\frac{1}{3}$$

$c^2 = \frac{13}{3}$

$c = \sqrt{13/3} = \sqrt{4\frac{1}{3}} \approx \sqrt{4.33} \approx$

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find $\bar{y} = f(c)$ & find $x = c$

$y = 4 - x^2$ on $[0, 3]$

$$\frac{1}{3-0}\int_0^3 4 - x^2\,dx = \frac{1}{3}\left(4x - \frac{x^3}{3}\right|_0^3$$

$$= \frac{1}{3}\left(\left(4\cdot 3 - \frac{3^3}{3}\right) - \left(0 - \frac{0}{3}\right)\right)$$

$$= \frac{1}{3}(12 - 9) = 1$$

$f(c) = 4 - c^2 = 1$

$c^2 = 3$

$c = \sqrt{3}$

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